What is claimed is:

1. A method for producing a cathode active material, comprising the steps of:

(a) providing a silver vanadium compound;

(b) mixing the silver vanadium compound with a metal salt to form a reaction mixture; and

(c) heating the reaction mixture to at least one reaction temperature in an oxidizing atmosphere to produce an ε-phase silver vanadium oxide having the formula $Ag_2V_4O_{11}$.

2. The method of claim 1 including cooling the ε-phase silver vanadium oxide from the reaction temperature to an ambient temperature in an oxidizing atmosphere.

3. The method of claim 1 including providing the silver vanadium compound as a γ-phase silver vanadium oxide having the formula $Ag_{1.2}V_3O_{8.1}$.

4. The method of claim 1 including selecting the metal salt from the group consisting of silver lactate, silver triflate, silver pentafluoropropionate, silver laurate, silver myristate, silver palmitate, silver stearate, silver vanadate, silver oxide, silver carbonate, copper oxide, copper carbonate, manganese carbonate, manganese oxide, magnesium carbonate, magnesium oxide, and combinations and mixtures thereof.

5. The method of claim 1 wherein the metal salt is Ag_2O and the ε-phase silver vanadium oxide has a BET surface area of about 0.54 m^2/g.

6. The method of claim 1 wherein the metal salt is Ag_2CO_3 and the ε-phase silver vanadium oxide has a BET surface area of about 0.44 m^2/g.

7. The method of claim 1 including heating the reaction mixture to the at least one reaction temperature in a range from about 300°C. to about 550°C.

8. The method of claim 1 including heating the reaction mixture to the at least one reaction temperature for about 5 hours to about 30 hours.

9. A method for providing a cathode electrode, comprising the steps of:

(a) providing γ-phase silver vanadium oxide having the formula $Ag_{1.2}V_3O_{8.1}$;

(b) mixing the γ-phase silver vanadium oxide with a metal salt to form a reaction mixture;

(c) heating the reaction mixtures to at least one reaction temperature in an oxidizing atmosphere to produce an electrode active material selected from the group consisting of $Ag_2V_4O_{11}$, $Cu_{0.2}Ag_{0.8}V_2O_{5.6}$, $Mn_{0.2}Ag_{0.8}V_2O_{5.8}$ and $Mg_{0.2}Ag_{0.8}V_2O_{5.6}$; and

(d) utilizing the electrode active material in a cathode electrode.

10. The method of claim 9 including cooling the electrode active material from the reaction temperature to an ambient temperature in an oxidizing atmosphere.

11. The method of claim 9 including selecting the metal

salt from the group consisting of silver lactate, silver triflate, silver pentafluoropropionate, silver laurate, silver myristate, silver palmitate, silver stearate, silver vanadate, silver oxide, silver carbonate, copper oxide, copper carbonate, manganese carbonate, manganese oxide, magnesium carbonate, magnesium oxide, and combinations and mixtures thereof.

12. The method of claim 9 including providing the metal salt as Ag_2O such that the product $Ag_2V_4O_{11}$ has a BET surface area of about 0.54 m^2/g.

13. The method of claim 9 including providing the metal salt as Ag_2CO_3 such that the product $Ag_2V_4O_{11}$ has a BET surface area of about 0.44 m^2/g.

14. The method of claim 9 including providing the metal salt as CuO such that the product $Cu_{0.2}Ag_{0.8}V_2O_{5.6}$ has a BET surface area of about 0.31 m^2/g.

15. The method of claim 9 including heating the reaction mixture to the at least one reaction temperature in a range from about 300°C. to about 550°C.

16. The method of claim 9 including heating the reaction mixture to the at least one reaction temperature for a period of about 5 hours to about 30 hours.

17. The method of claim 9 wherein the step of utilizing the electrode active material to form the cathode electrode includes the addition of a binder and a conductive material.

18. The method of claim 16 wherein the cathode electrode further comprises about 0 to about 3 weight percent of a carbonaceous conductive additive, about 0 to about 3 weight percent of a fluoro-resin powder, and about 94 to about 99 weight percent of the electrode active material.

19. A cathode for an electrochemical cell, the cathode comprising an ε-phase silver vanadium oxide characterized as prepared by heating a silver vanadium compound mixed with a metal salt to form a reaction mixture heated to at least one reaction temperature in an oxidizing atmosphere to produce the ε-phase silver vanadium oxide having the formula $Ag_2V_4O_{11}$.

20. The cathode of claim 19 wherein the silver vanadium compound is γ-phase silver vanadium oxide having the formula $Ag_{1.2}V_3O_{8.1}$.

21. The cathode of claim 19 wherein the metal salt is selected from the group consisting of silver lactate, silver triflate, silver pentafluoropropionate, silver laurate, silver myristate, silver palmitate, silver stearate, silver vanadate, silver oxide, silver carbonate, copper oxide, copper carbonate, manganese carbonate, manganese oxide, magnesium carbonate, magnesium oxide, and combinations and mixtures thereof.

22. The cathode of claim 19 wherein the metal salt is Ag_2O and the ε-phase silver vanadium oxide has a BET surface area of about 0.54 m^2/g.

23. The cathode of claim 19 wherein the metal salt is Ag_2CO_3 and the ε-phase silver vanadium oxide has a BET surface area of about 0.44 m^2/g.

24. The cathode of claim 19 wherein the reaction mixture is heated to the at least one reaction temperature in a range from about 300°C to about 550°C.

25. The cathode of claim 19 wherein the reaction mixture is heated to the at least one reaction temperature for about 5 hours to about 30 hours.

26. The cathode of claim 19 further comprising a binder and a conductive material.

27. A cathode for an electrochemical cell, the cathode comprising an electrode active material characterized as prepared from γ-phase silver vanadium oxide having the formula $Ag_{1.2}V_3O_{8.1}$ mixed with a metal salt compound to form a reaction mixture heated to at least one reaction temperature in an oxidizing atmosphere to produce the electrode active material selected from the group consisting of $Ag_2V_4O_{11}$, $Cu_{0.2}Ag_{0.8}V_2O_{5.6}$, $Mn_{0.2}Ag_{0.8}V_2O_{5.8}$, and $Mg_{0.2}Ag_{0.8}V_2O_{5.6}$.

28. The cathode of claim 27 wherein the metal salt is selected from the group consisting of silver lactate, silver triflate, silver pentafluoropropionate, silver laurate, silver myristate, silver palmitate, silver stearate, silver vanadate, silver oxide, silver carbonate, copper oxide, copper carbonate, manganese carbonate, manganese oxide, magnesium carbonate,

magnesium oxide, and combinations and mixtures thereof.

29. The cathode of claim 27 wherein the metal salt is Ag_2O such that the product electrode active material having the formula $Ag_2V_4O_{11}$ has a BET surface area of about 0.54 m^2/g.

30. The cathode of claim 27 wherein the metal salt is Ag_2CO_3 such that the product electrode active material having the formula $Ag_2V_4O_{11}$ has a BET surface area of about 0.44 m^2/g.

31. The cathode of claim 27 wherein the metal salt is CuO such that the product electrode active material having the formula $Cu_{0.2}Ag_{0.8}V_2O_{5.6}$ has a BET surface area of about 0.31 m^2/g.

32. A nonaqueous electrochemical cell, comprising:

(a) an anode;

(b) a cathode containing an active material comprising an ε-phase silver vanadium oxide compound characterized as having been prepared from a mixture of a silver vanadium compound and a metal salt forming a reaction mixture heated to at least one reaction temperature in an oxidizing atmosphere to produce the ε-phase silver vanadium oxide having the formula $Ag_2V_4O_{11}$;

(c) a non-aqueous electrolyte activating the anode and the cathode; and

(d) a separator material electrically insulating the anode from the cathode, and of a porosity

to allow for electrolyte flow.

33. The electrochemical cell of claim 32 wherein the anode is comprised of lithium.

34. The electrochemical cell of claim 32 wherein the silver vanadium containing compound is γ-phase silver vanadium oxide having the formula $Ag_{1.2}V_3O_{8.1}$.

35. The electrochemical cell of claim 32 wherein the metal salt is selected from the group consisting of silver lactate, silver triflate, silver pentafluoropropionate, silver laurate, silver myristate, silver palmitate, silver stearate, silver vanadate, silver oxide, silver carbonate, copper oxide, copper carbonate, manganese carbonate, manganese oxide, magnesium carbonate, magnesium oxide, and combinations and mixtures thereof.

36. The electrochemical cell of claim 32 wherein the metal salt is Ag_2O and the ε-phase silver vanadium oxide has a BET surface area of about 0.54 m^2/g.

37. The electrochemical cell of claim 32 wherein the metal salt is Ag_2CO_3 and the ε-phase silver vanadium oxide has a BET surface area of about 0.44 m^2/g.

38. The electrochemical cell of claim 32 wherein the reaction mixture is heated to the at least one reaction temperature in a range from about 300°C to about 550°C.

39. The electrochemical cell of claim 32 wherein the

reaction mixture is heated to the at least one reaction temperature for about 5 hours to about 30 hours.